IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:

DOHL, Christopher T. et al.

Serial No.: 10/620,019

Filed: 07/15/2003

Title: HIGH-PROTEIN, LOW CARBOHYDRATE BAKERY PRODUCTS

Group Art Unit: 1761

Examiner: TRAN, Lien Thuy

Confirmation No.: 8613

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Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.132

1. I, Dr. Ody Maningat, am the Vice President of Application Technology and Technical Services for MGP Ingredients, Inc. ("MGP Ingredients"). MGP Ingredients specializes in the manufacture of grain products, particularly those involving wheat gluten, for use in a wide variety of industries.

2. This Declaration is being submitted in order to establish that modified wheat protein concentrate products are chemically, physically, and functionally different from vital wheat gluten.

3. Attached hereto as Exhibits A-D are chemical, physical, and functional profiles for vital wheat gluten and three wheat protein concentrate specialty products manufactured by MGP Ingredients that are disclosed in the specification of the above application under the names FP 300, FP 500, and FP 600. FP 300 is generally produced by mixing vital wheat gluten with an ammonia solution followed by spray drying. FP 600 is produced similarly, however, sodium

metabisulphite and sodium ascorbate are also added. FP 500 is produced by mixing the wheat gluten with an acetic acid solution including sodium metabisulphite.

4. Vital wheat gluten comprises less protein than the three specialty wheat protein concentrate products. Furthermore, the wetability/dispersibility percentage of vital wheat gluten is higher for wheat gluten than any of the modified protein concentrate products. Finally, perhaps the greatest distinction between the vital wheat gluten and the protein concentrate products can be seen from the mixographs of each.

5. The mixographs were prepared according to the mixograph procedure taken from the American Association of Cereal Chemists (AACC Method 54-40A) which is attached hereto as Exhibit E. The mixograph method measures the resistance to mixing (indicated by the height of the curve) and the mixing time of hydrated flour or protein. Each vertical line on the graph represents a 30 second increment.

6. The mixograph for the vital wheat gluten shows high peaks indicating a great resistance to mixing. The mixographs for the three specialty wheat protein concentrate product have very small peaks thereby indicating substantially lower resistance to mixing. These graphs clearly demonstrate that modified specialty wheat protein concentrate products present greatly reduced mixing resistance properties over wheat gluten.

7. The different properties exhibited by the wheat protein concentrate products are a direct result of the modifications made to the wheat gluten from which they are derived.

8. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code, and

that such wilful false statements may jeopardize the validity of any patent issuing from the present application.

Date: 2/4/05

Ody Maningat

Dr. Ody Maningat

VITAL WHEAT GLUTEN

Lot # 8545

Typical Analysis

Physical and Chemical Properties

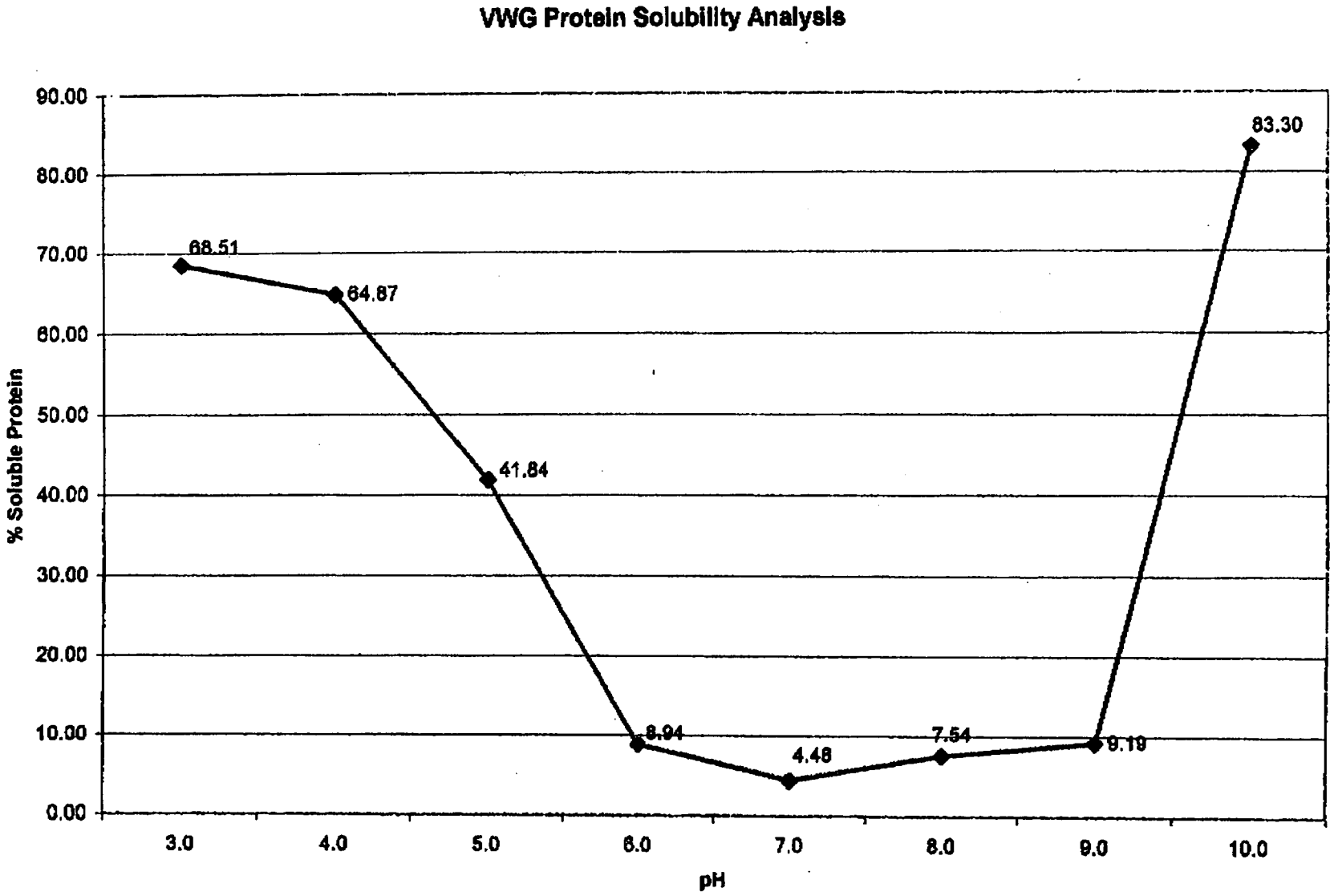
Protein (N x 5.7, dry basis)	76.75%
Moisture	6.40%
Ash	0.829%
pH	5.27
Sieve Analysis (% through 200 mesh)	86.20%
Bulk Density	35.67 lbs/ ft^3

Functional Properties

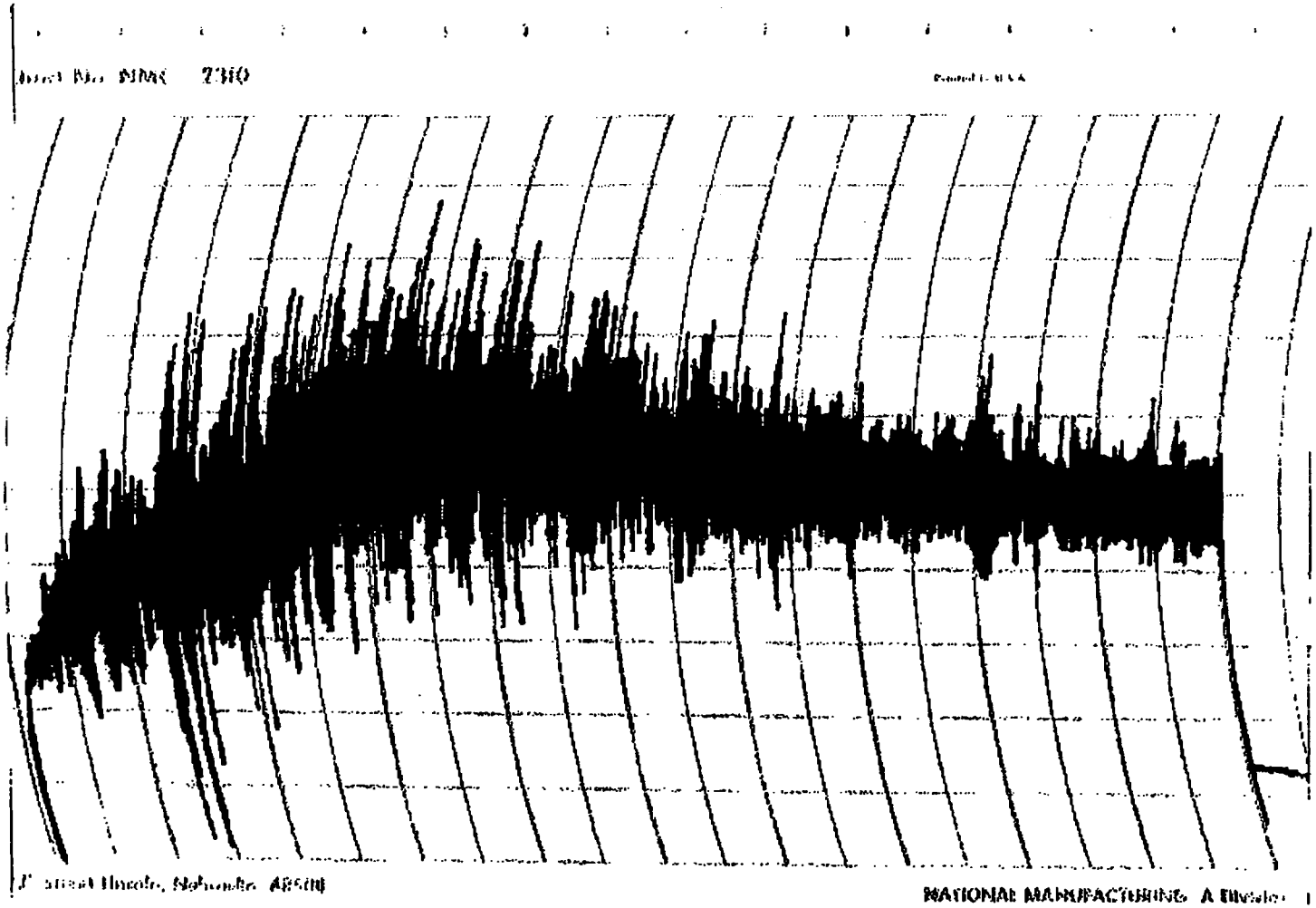
Water Holding Capacity	153.20%
Water Holding Capacity (2% salt)	135.95%
Oil Binding Capacity	130.94%
Wettability/ Dispersibility (30 sec.)	67.36%
Wettability/ Dispersibility (10 min.)	91.83%

Solubility in Water at Different pH (see solubility chart)

Mixing Characteristics (see mixograph curve)


VWG Protein Solubility Analysis
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
% Soluble Protein
68.51
64.87
41.84
8.94
4.48
7.54
9.19
83.30
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
pH

VITAL WHEAT GLUTEN



FP 300

Lot # 7345

Typical Analysis

Physical and Chemical Properties

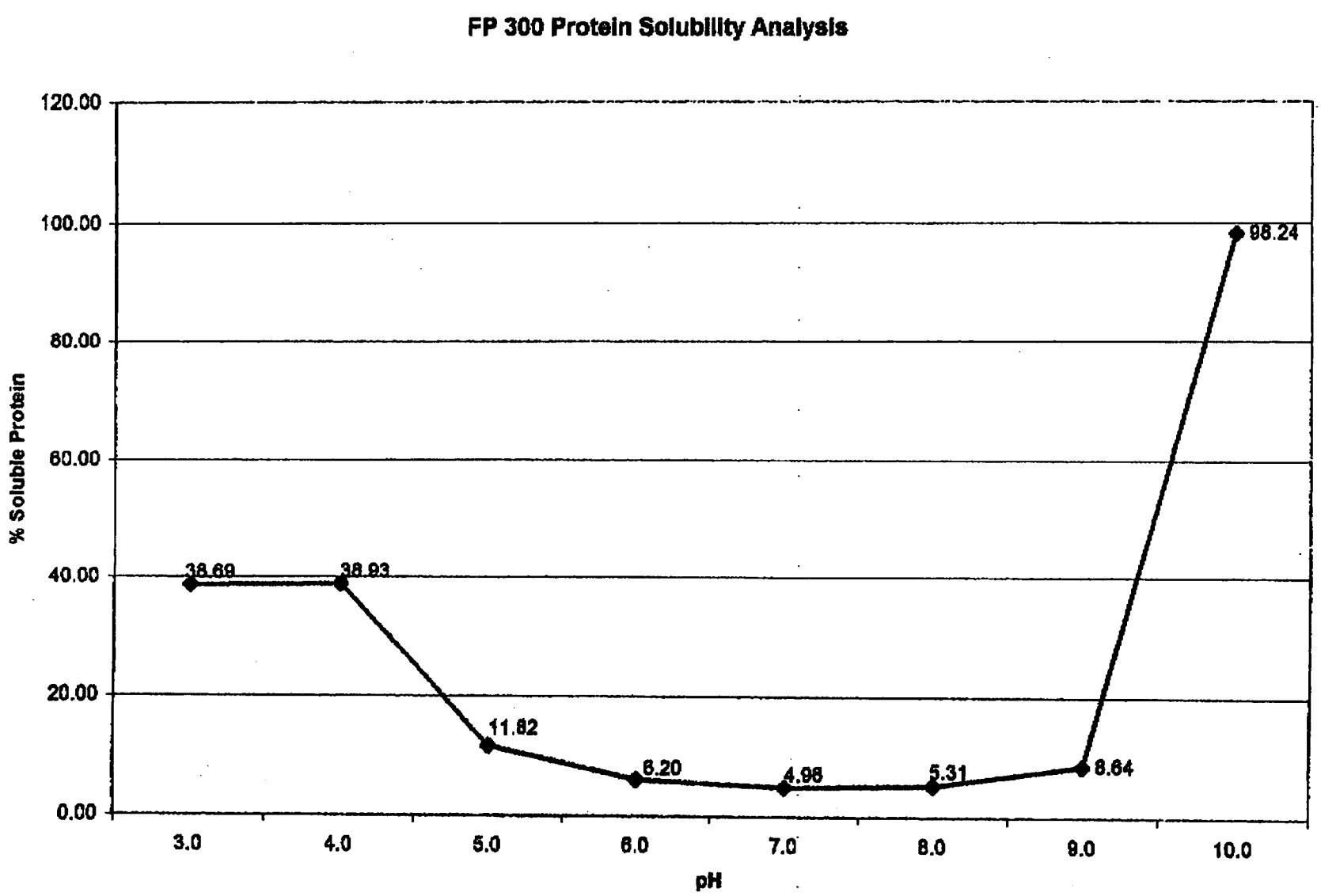
Protein (N x 5.7, dry basis)	80.90%
Moisture	5.88%
Ash	0.803%
pH	5.76
Sieve Analysis (% through 200 mesh)	99.60%
Bulk Density	25.48 lbs/ ft^3

Functional Properties

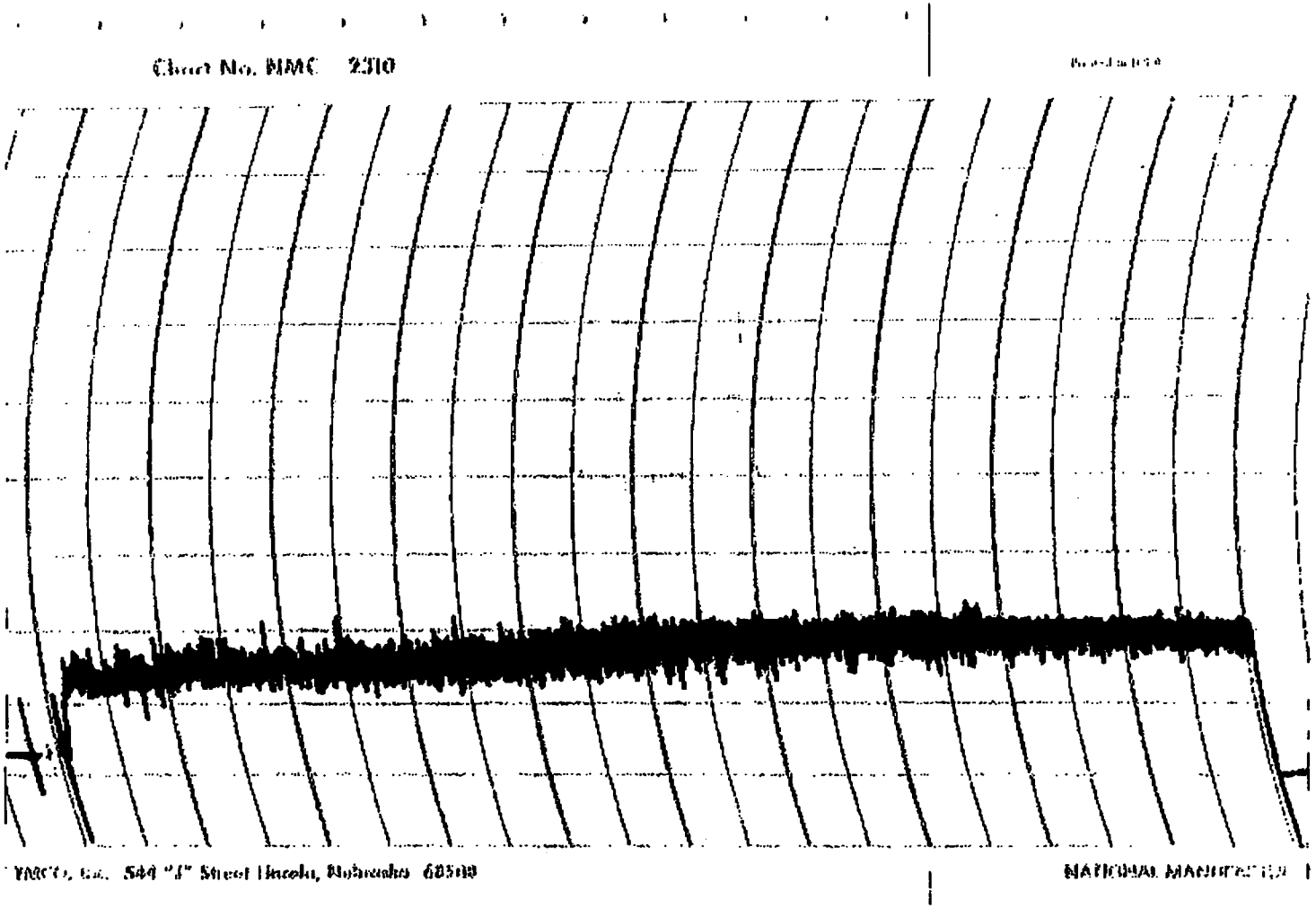
Water Holding Capacity	145.32%
Water Holding Capacity (2% salt)	136.09%
Oil Binding Capacity	160.31%
Wettability/ Dispersibility (30 sec.)	1.51%
Wettability/ Dispersibility (10 min.)	7.20%

Solubility in Water at Different pH (see solubility chart)

Mixing Characteristics (see mixograph curve)


FP 300 Protein Solubility Analysis
120.00
100.00
80.00
60.00
40.00
20.00
0.00
% Soluble Protein
38.69
38.93
11.82
6.20
4.98
5.31
8.64
98.24
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
pH

FP 300



FP 500

Lot # 7315

Typical Analysis

Physical and Chemical Properties

Protein (N x 5.7, dry basis)	79.65%
Moisture	5.91%
Ash	0.709%
pH	4.43
Sieve Analysis (% through 200 mesh)	98.70%
Bulk Density	24.97 lbs/ ft^3

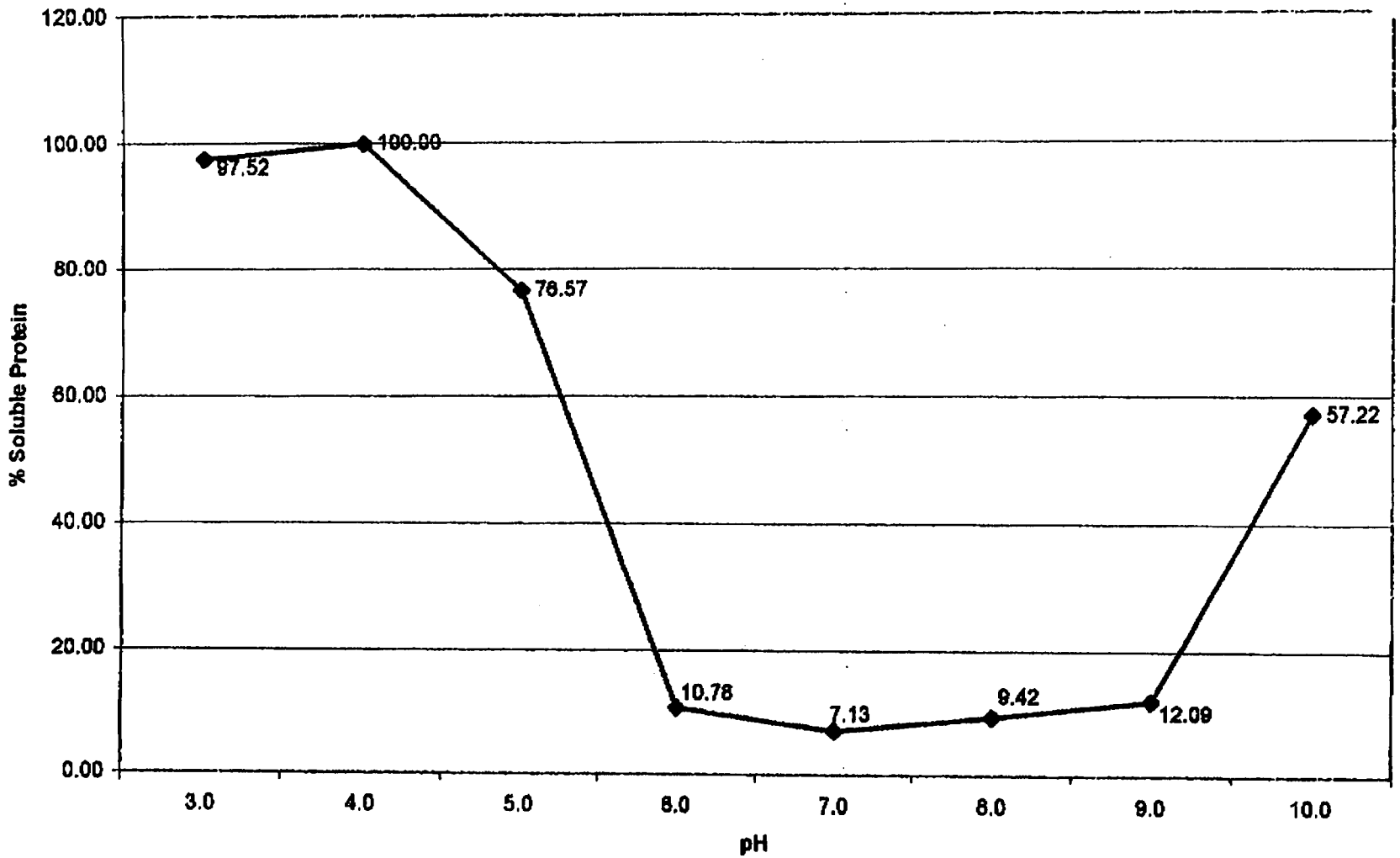
Functional Properties

Water Holding Capacity	165.66%
Water Holding Capacity (2% salt)	122.00%
Oil Binding Capacity	158.83%
Wettability/ Dispersibility (30 sec.)	20.17%
Wettability/ Dispersibility (10 min.)	42.83%

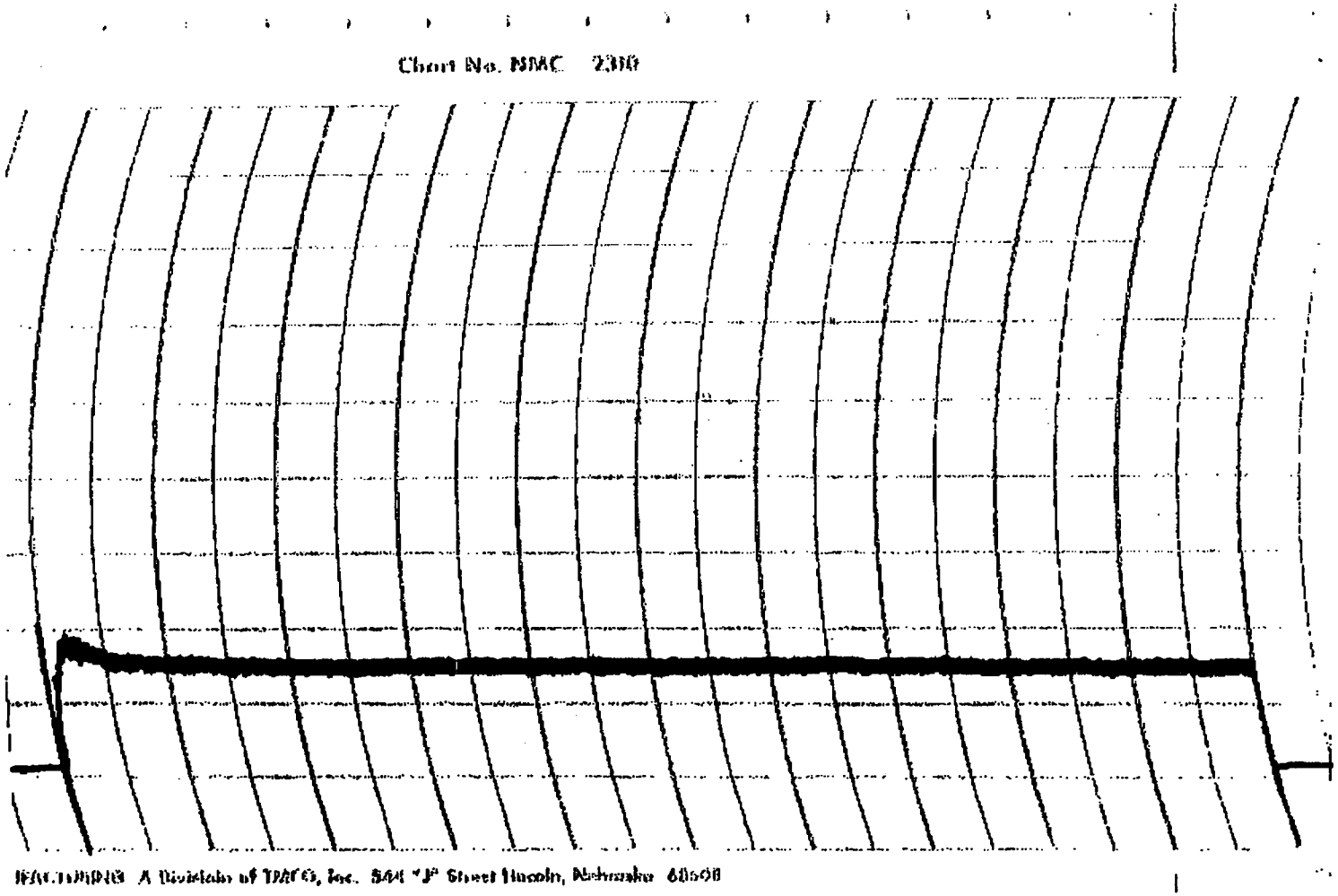
Solubility in Water at Different pH (see solubility chart)

Mixing Characteristics (see mixograph curve)

FP 500 Protein Solubility Analysis



FP 500



A Division of TMC, Inc. 540 "J" Street Lincoln, Nebraska 68508

FP 600

Lot # 7619

Typical Analysis

Physical and Chemical Properties

Protein (N x 5.7, dry basis)	80.25%
Moisture	4.79%
Ash	1.008%
pH	5.95
Sieve Analysis (% through 200 mesh)	98.58%
Bulk Density	22.54 lbs/ ft^3

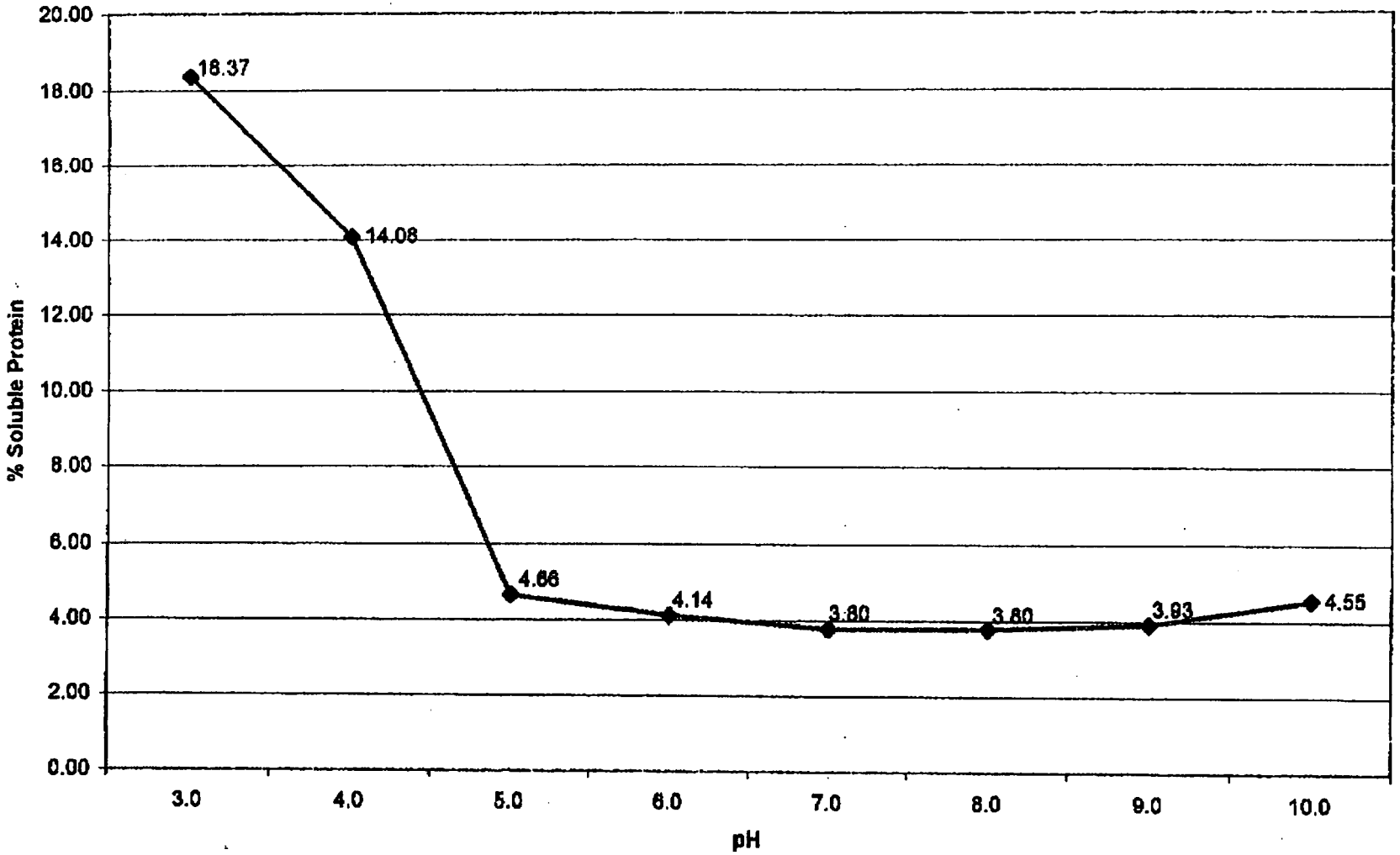
Functional Properties

Water Holding Capacity	110.48%
Water Holding Capacity (2% salt)	125.84%
Oil Binding Capacity	177.32%
Wettability/ Dispersibility (30 sec.)	0.00%
Wettability/ Dispersibility (10 min.)	82.27%

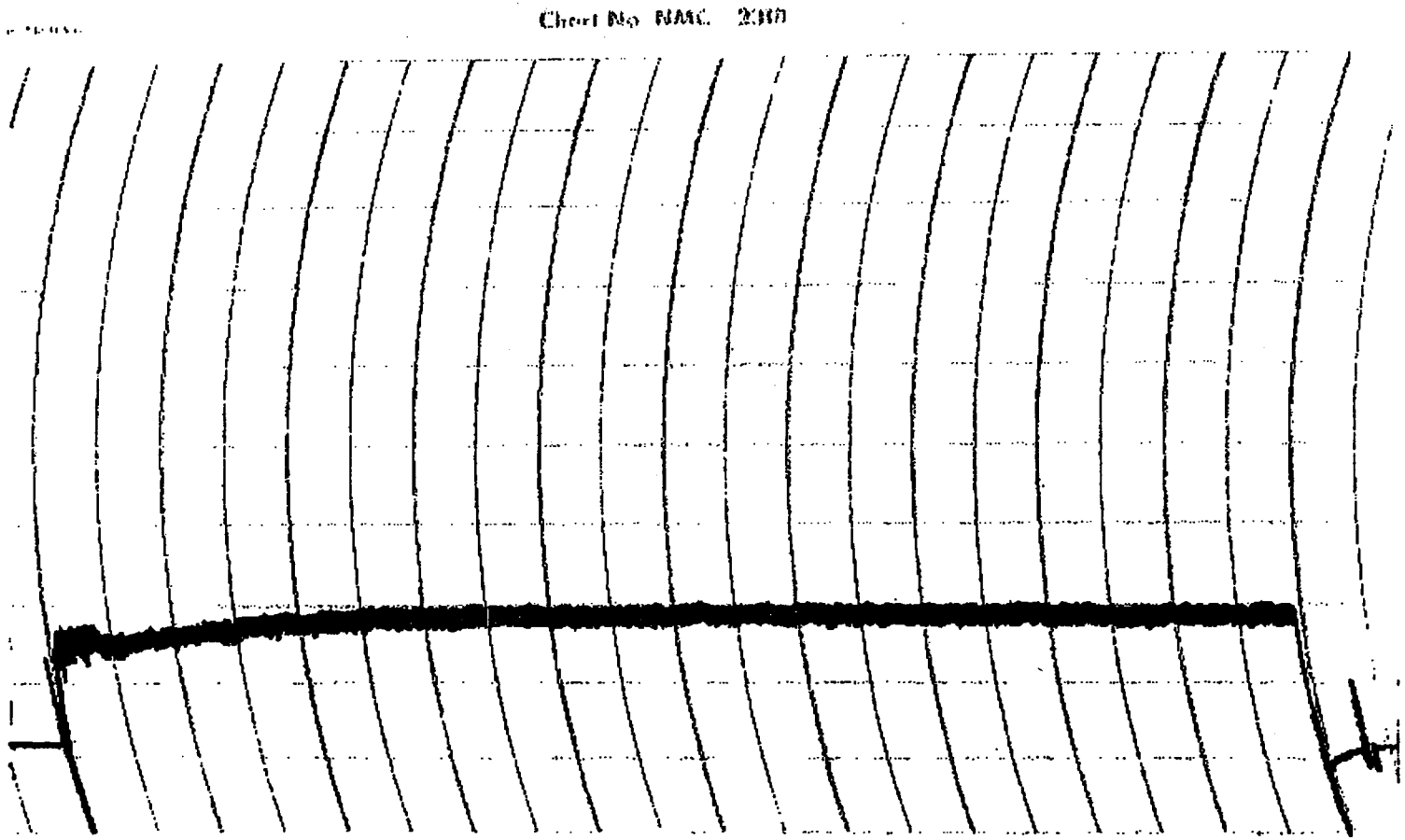
Solubility in Water at Different pH (see solubility chart)

Mixing Characteristics (see mixograph curve)

FP 600 Protein Solubility Analysis



FP 600



NEBRASKA MACHINERY, A Division of TMCO, Inc. 515 "J" Street Lincoln, Nebraska 68508

MIXOGRAPH PROCEDURE

Purpose: To determine mixing characteristics of product.

1. Weigh 7 grams of sample into mixing container with lid,
2. Weigh 3 grams of Midsol-50 starch into same container.
3. Close container and shake for 30 seconds to mix contents well.
4. Empty contents into mixograph bowl. Tap bowl on counter to level contents and place bowl in the proper slot on the mixograph machine.
5. Make a well in the center of the sample with a spatula and add 8.5 grams of distilled water.
6. Lower the mixing head into place. Using the timer, turn on the instrument and run for 10 minutes. Please start the curve on a dark line on the mixograph paper.
7. Record the peak height and hydration time.

MIXOGRAPH METHOD

Final approval 11-8-95

Definition

The mixograph measures and records resistance of a dough to mixing. The mixing curve (mixogram) indicates optimum development time (point of minimum mobility), tolerance to overmixing, and other dough characteristics and estimates bake absorption. The mixograph has been used to study the effects of added ingredients on mixing properties, dough rheology, blending, and quality control and for evaluation of hard, soft, and durum wheats.

Scope

Applicable to wheat flour

Apparatus

1. Mixograph with 10-g or 35-g mixing bowl. (National Manufacturing Co., 507 J St., Lincoln, NE 68508-2935). Flanged bowl, improved pen arm, and damping mechanism should be obtained for older 35-g instruments.
2. Blank bowl bottom and gauge for standardization of clearance between revolving pin and bowl bottom.
3. LeRoy pen No. 4 with 1.875-inch (in.) reservoir.
4. Template for revolving-pin alignment.
5. Mixing bowls (preferably four).
6. Balance (0.01 g).
7. Timer, Gra-Lab or equivalent.
8. Auto-buret with three-way stopcock and self-zero tip at top.

Procedure

Standardization

Bowl and head pins

1. Exposed length of each bowl and planetary pin should be 3.49 cm (1.375 in.) and 4.0 cm (1.575 in.) for 10- and 35-g models, respectively.
2. When head is in operating position, clearance between tips of planetary pins and bowl bottom should be 0.086 cm (0.034 in.).

Mixing head

1. Head should revolve at 88 ± 2 rpm.
2. Adjust stationary gear so that face of dough guard and front and rear pins are parallel to front of mixograph base when pins are inserted into pin-alignment template.
3. Center mixing head over bowl by adjusting head-chassis bearings. Adjust bearings so that head moves up and down freely.

Mixograph Method (continued)

Bowl platform

1. Bowl platform should be level.
2. Access to bowl-platform bearings is through hole on underside of mixograph cabinet. If bowl platform does not appear to be essentially friction-free (after removal of spring from slot), remove 3/4-in. nut, which allows bottom Timken bearing and brass spacer to be removed from bottom of cabinet and facilitates removal of bowl platform from top, together with top Timken bearing. Both Timken bearings should be cleaned and lubricated, using plain 10W oil, before being assembled. Avoid excessive tightening of 3/4-in. nut.

Pen and pen arm

1. Position pen arm on its supporting rod so that when pen is centered on paper, front and back of bowl platform are parallel to horizontal lines of recording paper.
2. Adjust damping-arm stops so that pen starts on bottom line of recording paper and stops on top line.
3. Pen arm should move up and down freely, and counterbalance on pen arm should be adjusted on arm (without pen) to be approximately balanced, falling slowly when released 1 cm above paper and rising slowly when released 2 cm above paper.
4. When mixogram is being recorded, weight on paper approximately equals weight of pen plus weight of ink (about 6 g).

Spring

1. Length of relaxed spring proper (between extremities of stubs but without slothook or threaded tail), when spring is lying in horizontal position, should be about 22.0 cm.
2. Length of relaxed spring proper plus slothook, when spring is lying in horizontal position, should be 22.7 cm for 10- and 35-g models.
3. Length of spring proper, when hanging vertically, should be 23.1 and 21.4 cm for 10- and 35-g models, respectively.
4. Extensibility of spring, hanging vertically, should be 3.5 ± 0.1 cm/100 g when several weights of 50–250 g are applied for 10-g model or 1.10 ± 0.01 cm/100 g when several weights of 100–800 g are applied for 35-g model.
5. When spring is installed, distance between spring stub and fixed, threaded, mounting bracket should be 1.1 cm. However, if total length of relaxed spring proper, lying in horizontal position (item 1), is not 22.0 cm, adjust distance so that length of spring proper plus distance between stub and mounting bracket totals 23.1 cm for 10- and 35-g models.
6. Shortest distance between rear point of attachment of spring (front of support post) and on-center of setting 12, when damping arm is at origin (pen at

Mixograph Method (continued)

bottom of recording paper), should be 22.4 cm.

7. Slothook should be in outermost position (slot 12) of spring-tension-index bar.

Damping (10-g model)

1. Damping arm (removable portion at right of bowl platform) should weigh 200 g without movable weights.
2. Two weights (50 g each with set-screw) usually should be set at outermost position on calibrated center of damping arm.

Damping (35-g model)

1. Damping arm should weigh 350 ± 5 g.
2. Adjust disk of damping mechanism to rotate freely before installing string.
3. When attached, string should extend spring 2.1 cm.

General

1. All bearing points should have trace of play to permit free movement. Lubricate lightly and regularly with nondetergent 10W oil.
2. Some of factors affecting curve width are amount of damping, drag of pen, room temperature, distance of planetary pins from bowl bottom, free-wheelingness of bowl-platform bearings, amount of absorption water, and gluten protein properties.
3. Some of factors affecting curve height are protein content, absorption water, room temperature, distance of planetary pins from bowl bottom, and extensibility, length, and slot location of spring.
4. To remove V-belt, first remove rear pulley. Position V-belt on both pulleys when replacing rear pulley. Do not force V-belt over pulleys.
5. Raise mixing head by lifting mixing head housing (not top plate).
6. Seat bowl properly and lower mixing head completely before starting mixograph motor. Failure to do either will result in bent pins.

Determination

1. Determine moisture content of flour as directed in oven method for flour (Methods **44-15A, -16, -40**). Weigh flour samples (10 or 35 g on 14% moisture basis) to 0.01 g. Keep flour samples in moisture-proof containers.
2. Room temperature should be maintained at 25 ± 1° (or other suitable constant temperature) 24 hours a day. Equipment, flour, and water should be at equilibrium with room temperature.
3. Following long idle periods, two or three mixograms of well-known standard flour should precede other recordings.
4. Transfer weighed flour to mixograph bowl with aid of camel-hair brush.

Mixograph Method (continued)

5. With tongue depressor (1.5 cm wide with ends squared and beveled) or rubber spatula, move flour between and somewhat past any two bowl pins, creating triangular hole in center of bowl.

6. Before starting each mixogram, determine that ink is flowing freely from pen.

7. Begin each mixogram on major arc and continue for fixed time to facilitate comparing and evaluating mixograms.

8. Dispense absorption water (see *Dough absorption* below) from automatic pipet into hole in flour. Immediately place bowl in position on mixograph, lower mixing head, and start recording mixogram. During first few seconds of mixing, brush flour particles that may splash on flare of mixing bowl back into bowl. Record sample number, date, bowl number, and other pertinent data on bottom, unlined strip of recording paper.

9. After last mixogram has been recorded, allow recording-paper motor to run for 16 minutes (min) so that several arcs appear beyond tail of last mixogram, just outside recording-paper opening on left side of mixograph cabinet. Cut paper three to four arcs beyond tail of last mixogram.

10. Allow mixing head to run with towel in place on bowl platform. Dough particles between planetaries and housing will dry and be dislodged onto towel. Bowl bottom and platform must be kept free of flour, dough, or other particles that could raise bowl sufficiently to alter clearance or permit contact between planetary pins and bowl bottom.

11. Efficiency in recording series of mixograms can be greatly improved by following systematic schedule. During 7 or 8 min of recording on mixogram, pertinent information can be recorded on that mixogram; previously mixed dough and bowl can be soaking in water while another bowl is being cleaned, dried, and brought to room temperature; and a fourth bowl can be readied with flour and its absorption water entered into buret. In this manner, 1 min is required between mixogram recordings.

Dough absorption

To estimate optimum absorption water (14% moisture basis), use equation

$$Y = 1.5X + 43.6,$$

where X = percent flour protein content (14% moisture basis) and Y = percent absorption water. Proper absorption can be determined by comparing curve characteristics with those of flours having optimum absorption. Add more or less water accordingly if another curve must be produced.

Interpretation

Measurements available from mixograms that indicate various dough-mixing

Mixograph Method (continued)

characteristics are the following:

1. Time to maximum height (min), also called peak or point of minimum mobility.

2. Maximum height of curve center or height of curve center at specified time after start of mixing.

3. Angle between ascending and descending portions of curve at peak. Center of curve at peak is taken as apex of angle; sides of angle are lines drawn along center of curves for specified number of minutes (1 min has been suggested) before and after peak is reached. Angles formed by these lines and horizontal may be used to further describe curves.

4. Area under curve. Area is measured with planimeter or personal computer having area integrator software. Duplicate runs made on different days are expected to agree within 5% in area. Area has been found to decrease average of 2 cm^2 for each 1° rise in temperature above 25°.

5. See references for other measurements that are useful in particular studies.

Notes

1. A 2-g direct drive electronic version mixograph is also available. Necessary modifications to this method are included with the instrument.

2. Software, hardware, and instrument modifications are available as a retrofit or can be originally installed on new mixographs. The computerization system automatically collects and analyzes the mixing curve for approximately 40 different properties.

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Mixograph Method (continued)

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